Ingersoll-Rand Energy Systems

Case

Utilimaster
Integrated Energy System
MT70L Microturbine

Desiccant system

Site

Utilimaster Corporation
Custom commercial vehicle manufacturer
Wakarusa, Indiana USA

Trigeneration Installation with Desiccant Dehumidification
Commissioned July 2004

Overview

Since 1973 Utilimaster has been building quality custom commercial vehicles that include walk-in vans, parcel delivery vans, and truck bodies. Utilimaster is dedicated to designing, building and servicing vehicles to a very high standards. Located just 100 miles east of Chicago, Utilimaster serves customers in a wide range of industries, including package delivery, truck rental, linen rental, food service and utilities.

Faced with a need to improve the efficiencies of the paint shop, reduce emissions and improve power quality and reliability, Utilimaster looked to NiSource Energy Technologies (NET) for an integrated energy solution. NET, a subsidiary of NiSource, identifies, develops and applies technological advances in the distributed generation market.

Challenge

When looking for a distributed energy solution requiring an agressive payback, it was essential to design a flexible system that could maximize the use of the system's exhaust heat.

To ensure maximum electrical savings, the system would have to be sized to offset base-load power, while operating continuously. Thermal energy would have to be matched to areas with the greatest need, enhancing the overall efficiency of the system. In order to minimize the impact to the production floor, the microturbine trigeneration solution was the obvious choice due to its small footprint and integral heat recovery.

Solution

After analyzing the processes and electrical loads, NET recommended a single 70kW Ingersoll-Rand microturbine for base-load electricity combined with a control system for dispatching generated thermal energy to meet the requirements of varying production schedules.

The exhaust heat use is divided between three processes. The drying area of the truck washing line was determined to have the greatest potential for thermal energy savings. A portion of the generated hot water from the microturbine is used to regenerate a custom-designed desiccant wheel which removes latent heat (humidity) while maintaining sensible heat (air temperature), resulting in a water removal efficiency four times greater than the previous system.

The balance of the microturbine co-generated hot-water is sent to a tube and finned heat exchanger that is used to maintain the temperature of the drying oven in the small parts paint line. The clean exhaust from the IR microturbine is directed to the paint curing booth.

Benefits

Since the project was commissioned in July 2004, monthly projected saving of more than $2,800 have been realized and represent a net annual electrical and gas savings of more than $35,000. Based on current electric and natural gas rates, payback for the entire system is expected to be close to 12 months.

For more information about Ingersoll-Rand Microturbines and Industrial Standby Generators, please contact IR Energy Systems or visit www.irenergysystems.com

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By installing the microturbine in a grid-parallel configuration, Utilimaster was able to reduce equipment, installation and permitting costs. To help offset capital costs, Utilimaster applied for and received a $30,000 distributed generation grant from the State of Indiana's Department of Commerce.

By redesigning, rather than replacing, the process from an energy balance perspective, NET and Utilimaster were able to minimize the impact on production and keep a redundant system for maintenance.

Specifications

The microturbine installation includes an Ingersoll-Rand 70kW cogen microturbine operating on natural gas, an 80kVAr capacitor bank for reactive power compensation and a Beckwith M3410 protective relay.

The desiccant system and engineering were supplied by NET. Electrical connections, exhaust ductwork, pump and water piping were installed by Utilimaster and commissioned with the assistance of Ingersoll-Rand and NET.

A remote monitoring system is used to observe site operation data for maintenance and troubleshooting. This data is also used in reports required under the terms of the Distributed Generation Grant Program.

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